Live-animal measurements and carcass characteristics of Sudan Desert and Australian Merino sheep

S. A.BABIKER and S. A. MOHAMED

Institute of Animal Production, University of Khartoum, Khartoum North, P.0 .Box 32, Sudan.

SUMMARY

Sudan Desert sheep and Australian Merino sheep were compared for live-animal measurements, carcass conformation and composition. The Desert sheep had significantly longer trunks ($p < 0.05$) and higher wither heights ($p < 0.001$) than Australian Merino. Carcass length, circumference of chest and the length of leg, tibia, fore-limb and tail were significantly ($p < 0.001$) greater in the Desert sheep than the Merino. The Desert sheep dressed lighter, had significantly ($p < 0.05$) more muscles, less fat, heavier bone and significantly ($p < 0.001$) more trim than the Merino.

INTRODUC___HON

Livestock and meat traders are concerned with breeds that yield leaner carcass of desireable conformation and having much of the saleable meat distributed in the higher priced cuts. The consumer is concerned with price and meat quality where leanness is the most desired quality attribute (Preston and Willis, 1975; Cooper and Willis, 1973; Allen and Kilkenny, 1984). Thus carcass conformation and leanness are the most essential quality attributes that create marked competition for the commodity meat. Regarding sheep trade, the Sudan Desert sheep is fomous for its large size and lean yield in its traditional Middle East markets where it fetches high prices. **The breed is now facing hard competition** from other sheen **breeds recently introduced into these markets, particu-**

larly Australian Merino, which is sold at a very low price. To illucidate carcass characteristics of the Desert sheep and compare it with its competitor in the Middle East market, the Australian Merino, this work was initiated.

MATERIALS AND METHODS

Ten male Desert sheep were selected from a fattened flock kept in Elkadru quarantine, Khartoum North, Sudan, for export. The animals liveweight ranged from 58 to 69 kg with a mean of 65 kg. They all had two or three pairs of permanent incisor teeth. A similar number of male Australian Merino sheep were selected from a flock imported in Sudan for domestic slaughter. Their liveweight ranged from 60 - 69 kg with a mean of.65 kg and they all had two or three pairs of permanent incisor teeth. The fattening ration comprised of sorghum fodder and commercial concentrates offered ad libitum.

Animals were transported to the premises of the Institute of Animal Production, Khartoum University, for slaughter and evaluation. After an overnight fast except from water, liveweight (slaughter weight) and external measurements were taken as in Owen, Norman, Fisher and Frost (1977). They included wither height, neck length and head length. Following slaughter carcass weight and all offal parts including gut fill were recorded. Carcasses were then chilled for 24 hours at 4 °C.

Carcass measurements and dissection:

The chilled carcasses were weighed and then carcass measurements were taken. Carcass length and depth, barrel and chest circumferences, leg, forelimb, tibia and tail lengths, thigh thickness and tail base width were measured as described by Owen et. al. (1977).

The tail was removed at its base and its weight was recorded. The carcass was then split down the mid-line. The left side was weighed kidney and the kidney knob channel fat removed and weighed seperately and then the side was dissected into muscle, fat, bone and trim.

All weights and measurements taken were subjected to student .t-test analysis according to Snedecor and Cochran (1976).

RESULTS

Live-animal and carcass measurements:

The Desert sheep was significantly ($p < 0.001$) higher at withers (84 vs 71 cm) had significantly ($p < 0.05$) deep chests, (37 vs 34 cm) longer trunks (74 vs 69 cm) and heads (32 vs 28 cm) than the Australian Merino sheep. The latter was significantly ($p < 0.001$) wider at hips (38 vs 23 cm).

As seen in table 1 the Desert sheep carcass was significantly ($p < 0.001$) longer than that of Australian Merino sheep. Chest circumference was also significantly ($p < 0.001$) greater in the former than in the latter breed. The leg, tibia, fore-limb and tail were significantly ($p < 0.001$) longer in the Desert sheep carcass than in the Merino sheep. Thigh thickness and tail base width were also significantly ($p < 0.05$) greater in the Desert sheep.

Talbe 1: Carcass measurements (cm).

	Australian Merino sheep	Sudan Desert Sheep	p
Carcass length	62.6±2.2	72.4±1.9	0.001
Carcass depth	34 . 0±1.7	33.6±1.2	NS
Circumference of barrel	85.0±2.6	85.4±2.3	0.001
Thigh thickness	10.2±1.0	11.1±0.7	0.05
Leg length	43.9±1.7	50.7±2.1	0.001
Tibia length	26.3±3.1	33. 6±0. 6	0.001
Fore-limb length	31.9±2.0	36.2±1.6	0.001
Tail length	09.0±1.8	51.9±6.8	0.001
Tail base width	08.7±1.2	11.3±1.9	0.01

Slaughter weight and carcass characteristics:

Following pre-slaughter fasting. for 16 hours the Merino sheep lost

more weight than the Desert sheep (table 2); gut fill was significantly ($p < 0.001$) lighter in the former breed than in the latter. Slaughter weight was also significantly ($p < 0.01$) higher in the Merino than in the Desert sheep.

Carcass weights were not significantly different between the two breeds. The dressing percentage on empty body weight base was greater and on liveweight base was significantly ($p < 0.01$) greater in the Merino than in the Desert sheep.

The Merino sheep carcass had significantly ($p < 0.05$) less muscles, more fat, lighter bone and significantly ($p < 0.001$) less trim than the Desert sheep carcass (table 2). Shrink was lower in the Merino sheep than in the Desert sheep carcass.

Table 2: Carcass characteristics of export Australian Merino and Sudan Desert sheep.

	Australian Merino sheep	Sudan Desert sheep	p
Liveweight (kg)	64.8±3.1	65.0±3.0	NS
Slaughter weight (kg)	55.1±4.5	62.1±3.5	0.01
Gut fill (kg)	10.5±2.2	16.5±2.2	0.001
Hot carcass weight (kg)	29.6±2.7	31.0±2.8	NS
Cold carcass weight (kg)	28.8±2.0	30.0±2.5	NS
Dressing percentage			
Liveweight base	52.5±2.9	48.4±2.6	0.01
Empty body weight base	58.1±2.7	56.4±2.2	NS
Carcass composition (%)			
Muscle	51.8±3.6	55.2±3.6	0.05
Fat	26.5±2.9	20.4±5.5	0.05
Bone	15.8±2.1	17.5±1.5	NS
Trim	3.2±0.6	4.8±0.8	0.001
Shrink	2.4±1.2	2.5±1.1	NS

Carcass components:

The weights of the carcass components are given in table 3. The skin of the Merino sheep was significantly ($p < 0.001$) heavier than that of the Desert sheep. The latter breed had significantly ($p < 0.05$) heavier livers, stomachs and intestines. Other carcass components were similar in weights in the two breeds.

Table 3: Carcass components of Australian Merino and Sudan Desert sheep (% of slaughter weight).

	Australian Merino sheep	Sudan Desert sheep	
Head	5.7±2.00	5.8±2.10	NS
Skin	11.6±1.70	8.8±0.90	0.001
Feet	1.8±0.70	2.2±0.80	NS
Liver	1.1±0.50	1.8±0.70	0.05
Heart	0.5±0.20	0.4±0.10	NS
Stomach (empty)	2.7±0.50	3.1±0.50	0.05
Intestines (empty)	2.8,±0.40	3.9±0.50	0.001
Spleen	0.2±0.10	0.2±0.10	NS
Omentum	3.1±0.50	1.4±0.70	NS
Mesentric fat	1.3±0.50	1.4±0.70	NS
Kidneys	0.2±0.02	0.3±0.01	NS
Kidneys knob channel fat	2.1±0.80	2.1±0.90	NS
Lung, diaphragm and trachea	2.3±0.20	2.2±0.50	NS

DISCUSSION

The fact that the Desert sheep had longer legs and trunk than Australian Merino might be partly genetical and partly due to their warm envirnoment, as animals in the warm appear to be lean and elongated

(Ingrum and Dauncey, 1986). Earlier Macleroy (1961) attributed the long legs and narrow trunk· of the Desert sheep as an adaptation to their habitat that allows easy gaite which assists in the search for the scanty pasture.

The carcass length differences were reflections of trunk length differences between the two breeds. Similarly the greater lengths of legs, tibia and fore-limb of the Desert sheep were consequence of breed differences in these body parts. Breed differences were also shown in the weight, length and base width of the tail. These differences were mainly genetical in addition to lack of docking practice in the Desert sheep.

The slaughter weight of the Desert sheep was significantly ($p < 0.01$) greater than that of the Merino sheep, their carcass weights were not significantly different but the latter had greater dressing percentage than the former. This could be • explained by the lighter gut fill and slaughter weight of the Merino.

Tne fact that the Merino sheep had more carcass fat than the Desert sheep agreed with the earlier finding of Gaili (1979) that the Desert sheep had a lower rate of fat deposition than temperate breeds as the Dorset Horn and the Hampshire. Genetic difference and adaptation to habitat are involved. Animals kept at low ambient temperature (10 °C) were found to have more body fat than those kept at high temperature (35 °C) (Ingram and Dauncey, 1986).

The proportion of carcass muscle was significantly ($p < 0.05$) greater in the Desert sheep than in Merino's possibly due to breed differences and to the relative decrease in the fat proportion in the former breed. Although not significantly different the Desert sheep carcass had a higher proportion of bone weight than the Merino sheep carcass which agreed with the previous findings of Gaili (1979) that the bone weight was heavier in the Desert sheep than in temperate sheep breeds.

The presence of the thick wool layer in the Merino compared with the thin hair layer in the Desert sheep might partly explain the difference observed in skin weight. The proportional sizes of the abdominal organs as liver, gastrointestinal traf_-*. and kidneys were greater in the Desert sheep which could be a reflection of the heavier body weight of this group of animals in this study.

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